

PRELIMINARY DESIGN STUDY REPORT

ACCELERATION LANE FOR THE ENTRANCE RAMP  
TO NORTHBOUND GEORGE WASHINGTON MEMORIAL PARKWAY  
AT THE CIA-FHWA FEDERAL AREA

Prepared by:  
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Subject: Acceleration Lane for the Entrance Ramp  
to NB George Washington Memorial Parkway  
at the CIA-FHWA Federal Area

The existing condition at the entrance ramp to the northbound George Washington Memorial Parkway (GWMP) at the CIA-FHWA Federal Area provides for two through lanes and no acceleration lane. However, the original design as shown in plans for Project 1A12 was for the present ramp geometry to connect to a roadway with three through lanes. Proper striping would have allowed an adequate acceleration lane. At the time of Project 1A12, the third lane was considered unnecessary. With a major facility addition by both the CIA and FHWA at the Langley site, traffic will increase from the present peak volume of 1000 vehicles per hour (vph) at the merge point to an estimated 1700 vph. For this estimated volume, it will be necessary to provide an acceleration lane just to maintain a level of service D ("that approaching instability and incipient congestion"). The objective of this study is to propose ways that an acceleration lane, meeting present design standards, may be developed without a major reconstruction of the interchange.

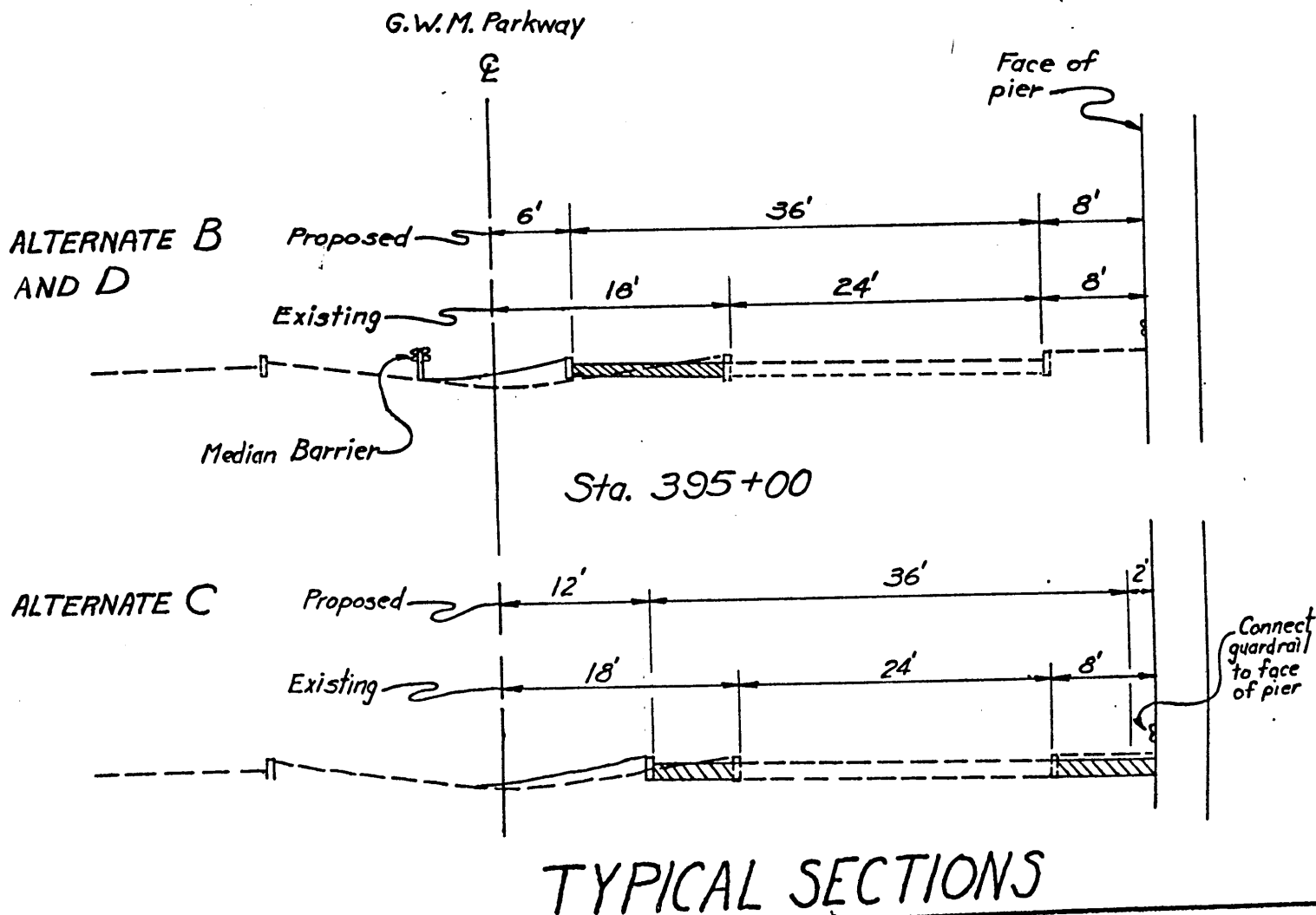
Several ways of developing the lane were considered and discarded. These included creating a stop at the northeast abutment with a crossover of the exit ramp and constructing a new entrance ramp north of the bridge or by relocating the exit ramp north of the bridge and extending the entrance ramp southward. Due to safety, existing conditions (bridge skew and topography), and excessive cost, these were not considered feasible.

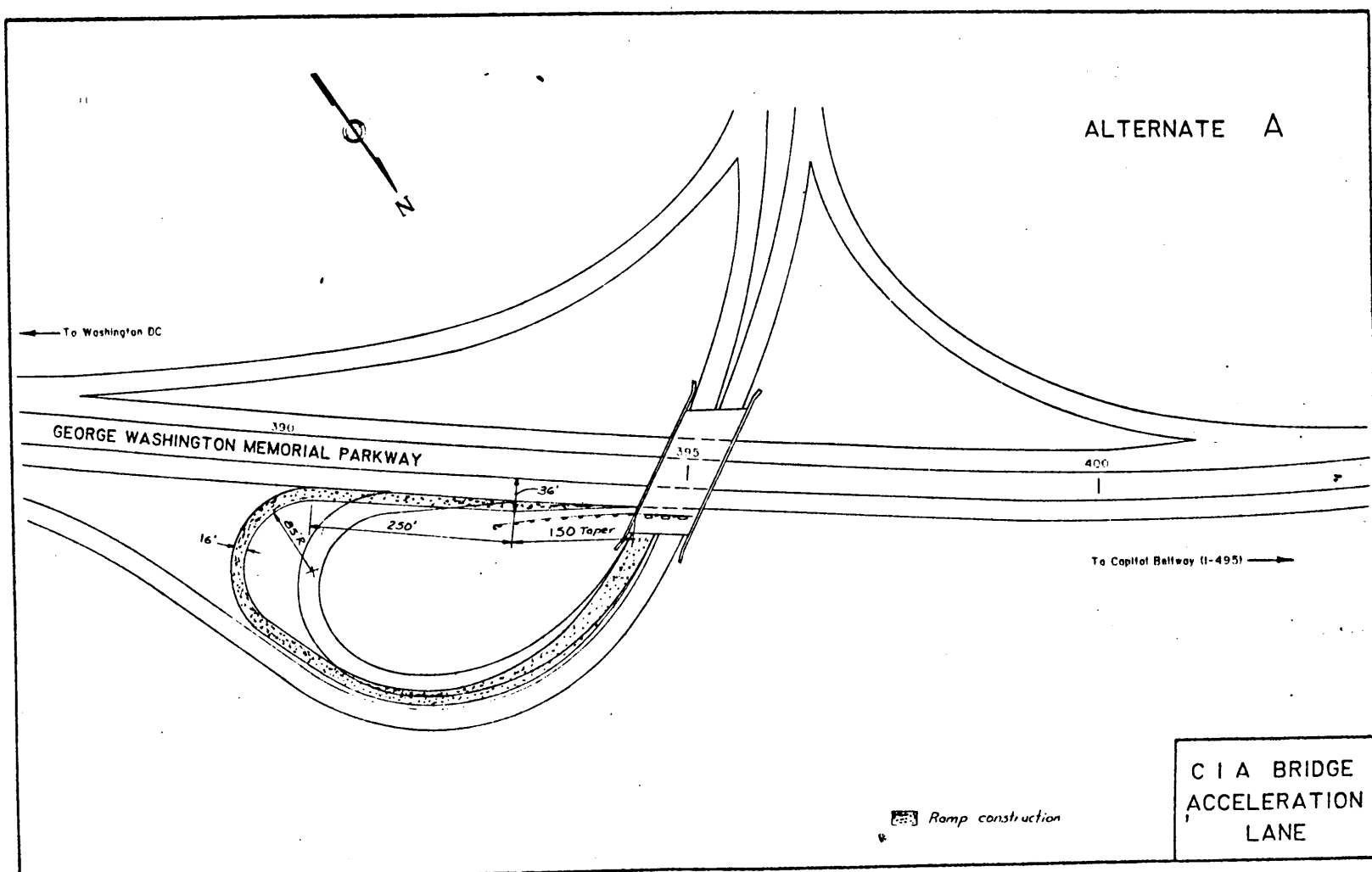
Alternative "A" shown on the attached plan sheet was first considered because it does not require a shift of through traffic. Although extensive modification of the entrance ramp would be necessary, ramp traffic could be maintained with few problems during construction. The new ramp would parallel the exit ramp for a greater distance, then by shortening the radius of the final ramp curve, a longer acceleration lane would be created. The radius of the curve can not be decreased below 85-90 feet (20 MPH curve) or entrance speeds will drop, requiring an even longer acceleration lane. Using AASHTO design guides, this alternative requires an acceleration lane of 400 feet, not including taper. However, a maximum acceleration lane of only 250 feet with a taper of 150 feet is attainable by this alternative, a gain of only 100 feet over the existing conditions. Not only would the 250-foot lane be substandard, but the lane approaches the pier at a more hazardous angle. The existing bridge pier warrants a safety barrier regardless of which, or if any, acceleration lane is constructed. The approximate construction cost of Alternative "A" is \$200,000.

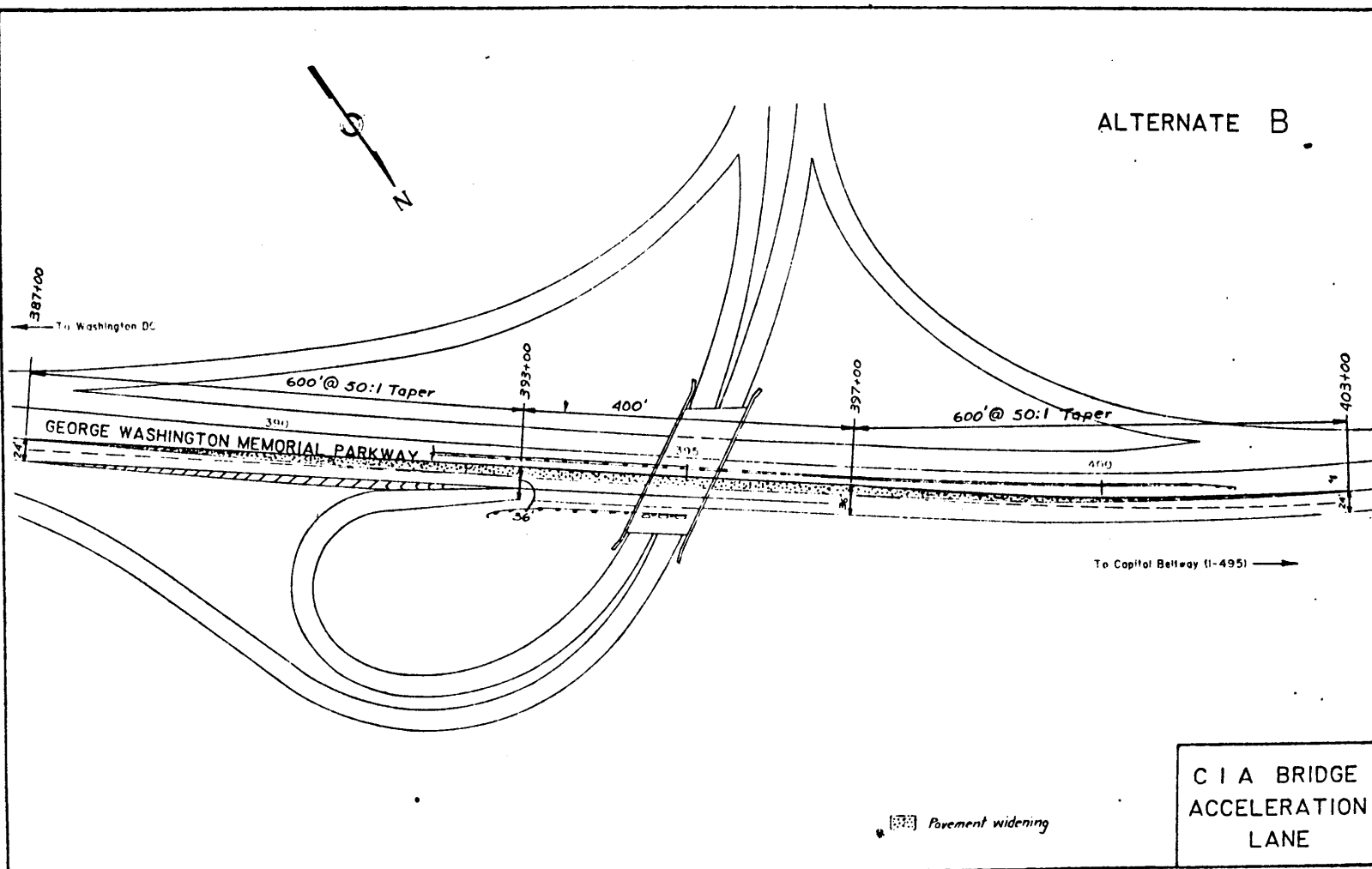
The most desirable method of obtaining the needed acceleration lane is Alternative "B". This method reduces the width of the median, shifting through traffic with a 50:1 taper to develop a full-width acceleration lane at the merge point. The acceleration lane is carried the necessary 400 feet, then through traffic is shifted back at a 50:1 taper to the original

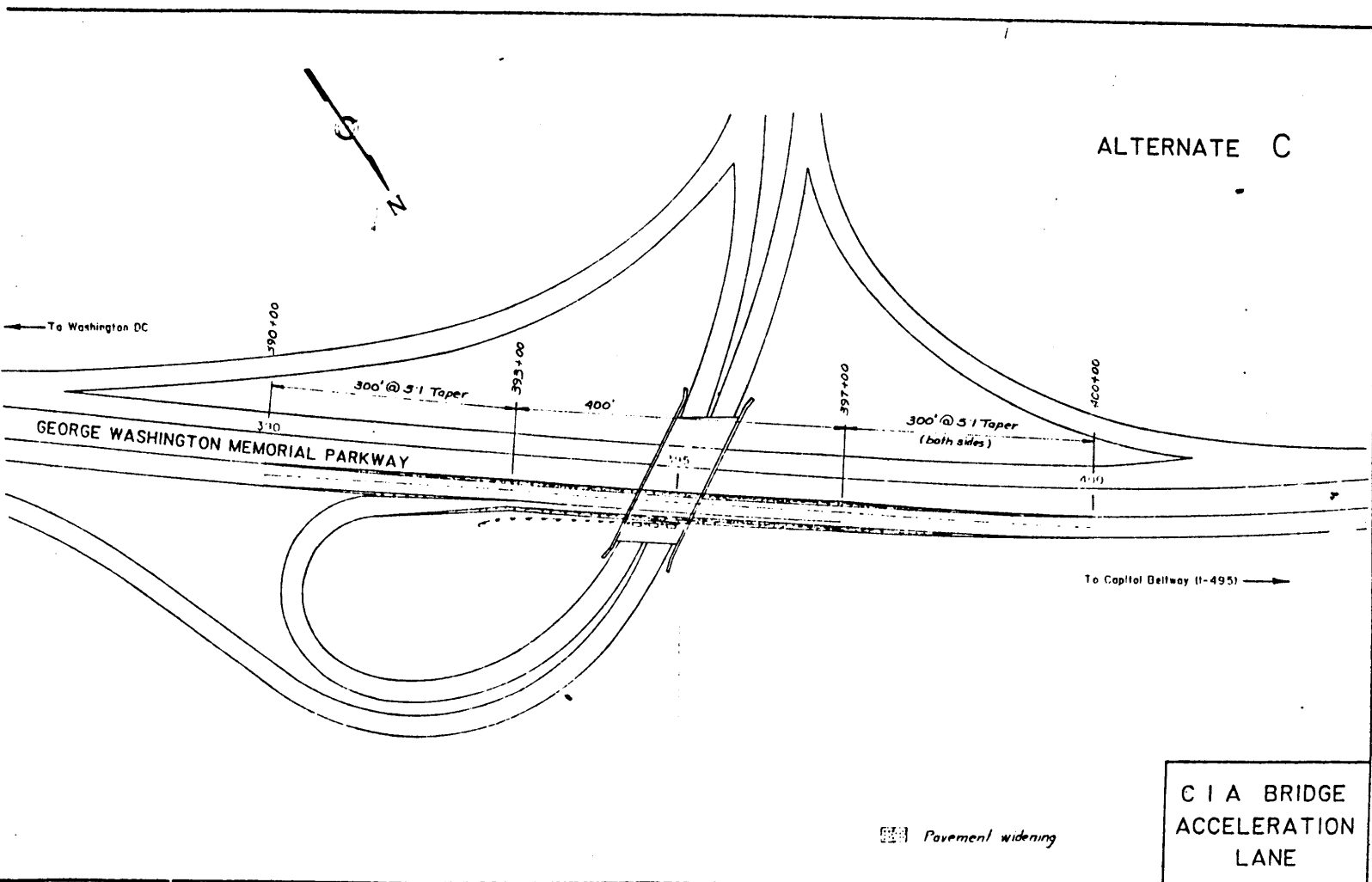
lanes. By developing the full lane on the median side (see typical section Alternate B), pavement construction joints more closely follow lane lines, and construction operations are restricted to one side of through traffic. The median would be reduced from the present 36-foot to a 24-foot width. This would warrant the installation of a median barrier in addition to the barrier at the pier. The approximate construction cost of Alternative "B" is \$180,000.

Alternative "C" would be to develop the acceleration lane by taking 6 feet from the median side and 6 feet from the right side (see typical section Alternate C). This would only require the barrier at the bridge pier. However, construction would have to be completed in stages on both sides of the through traffic, adding to construction time. This alternative would have a construction cost comparable to Alternative "B", since the cost reduction due to eliminating the median barrier would be offset by the increased costs of stage construction.









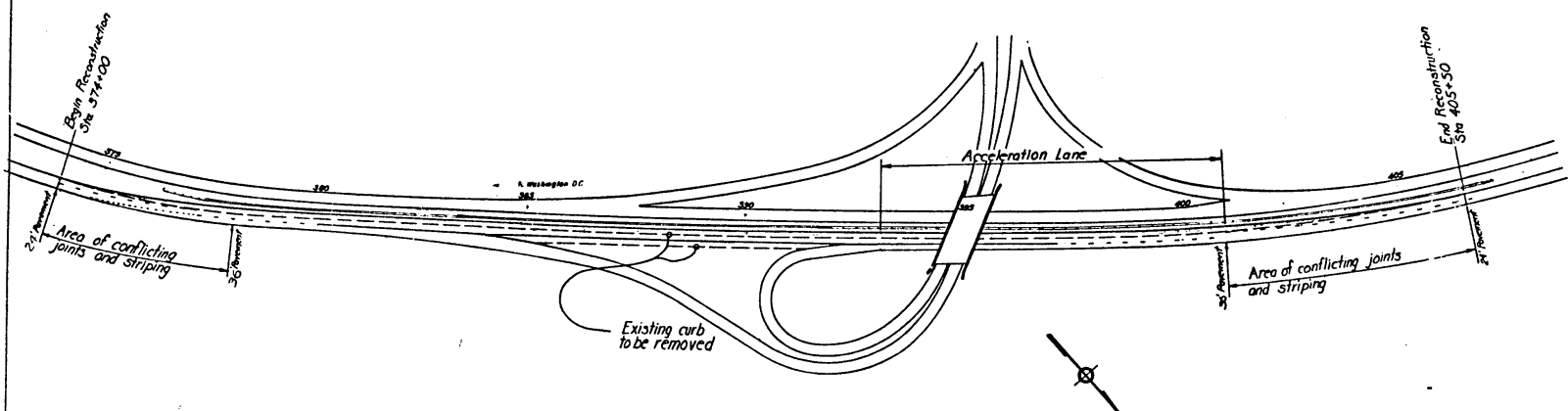


In a meeting to discuss the attached study of alternatives for the acceleration lane, representatives decided that a plan similar to Alternative B would be the most acceptable. Alternative D develops the lane totally on the median side, similar to Alternative B, except "D" uses entrance and exit spirals instead of straight tapers to develop the additional lane. This modification will maintain a constant direction of curvature and avoid leaving the appearance that the acceleration lane was an "add on".

In addition to the new left curb alignment, the right curb between the exit and entrance ramps would be adjusted to maintain a constant 24' roadway width. The unnecessary pavement would be removed and the area seeded. Although the unused area of pavement could be striped out, the striping would not be consistent with the present Parkway character. As in Alternative B, the reduced median would warrant the installation of a median barrier, in addition to the barrier at the pier.

In order to eliminate conflicting construction joints and lane lines, the Parkway surface would be removed and replaced within the spiral transition sections of the new alignment. As a final measure the approximately 3200' of Parkway within the construction limits would be overlaid and restriped. The total construction cost of this type of improvement would be approximately \$370,000.

## ALTERNATE D



CIA BRIDGE  
ACCELERATION LANE

PRELIMINARY  
ENGINEER'S ESTIMATE

PAGE 1 OF 2

FEDERAL HIGHWAY ADMINISTRATION  
EASTERN DIRECT FEDERAL DIVISION  
ARLINGTON, VIRGINIA

PROJECT *GWMP*  
*Acceleration lane at CIA-Bridge*

Pay items numbered                      are major items

PAY ITEM NAME	ESTIMATED QUANTITY	PAY UNIT	UNIT PRICE	AMOUNT
202(5B) Removal of concrete curb	4,000	Ln. ft.	2.50	10,000
202(3A) Removal of bituminous pavement	900	Sq. yd	5.00	4,500
203(3) Unclassified excavation	1,800	Cu. yd.	15.00	27,000
301(1) Plant mix bituminous base	700	Ton	40.00	28,000
304(3F) Crushed aggregate base				
grading B, C or D	900	Ton	20.00	18,000
403(10) Hot bituminous concrete				
pavement, grading D	1,800	Ton	45.00	81,000
609(1E) Portland cement concrete				
curb, 16 inch depth	4,100	Ln. ft.	10.00	41,000
634(1) Traffic markings, reflectorized				
broken white or yellow	4,500	Ln. ft.	0.15	675
634(2) Traffic markings, reflectorized				
solid white or yellow	7,500	Ln. ft.	0.20	1,500
635(17) Temporary traffic markings	3,500	Ln. ft.	0.50	1,750
635(18) Traffic marking removal	5,000	Ln. ft.	1.00	5,000

